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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 09/550,649	**Applicant(s)** GUERTIN ET AL.	
	Examiner DAVID S. KIM	**Art Unit** 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 June 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-22_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-22_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Applicant's response to the objections to **claims 5 and 9** in the previous Office Action (mailed 04 April 2008) is noted and appreciated. Applicant responded by amending these claims. Applicant's response overcomes the previous objection to claim 9, which is presently withdrawn. Applicant's amendment of claim 5 introduces a new objection. In particular, **in claim 5**, under the "identifying" step, a portion reads "wherein each diagnostic output signal of plurality" where -- wherein each diagnostic output signal of the plurality -- may be intended.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. Applicant's response to the rejection of **claims 1-22** under 35 U.S.C. 112, first paragraph, in the previous Office Action (mailed on 04 April 2008) is noted and appreciated. Applicant responded by amending the claims. However, Applicant's amendments introduce additional issues under 35 U.S.C. 112, which are detailed below.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 1-22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In particular, notice the following limitations in independent claims 1, 5, and 9:

(claim 1) "wherein each of the plurality of receiver diagnostic output signals indicates a number of bit errors which were produced from the ***first optical receiver*** up to and including a corresponding optical receiver of the each of the plurality of receiver diagnostic output signals" (emphasis Examiner's).

(claim 5) "wherein each of the plurality of receiver diagnostic output signals indicates a number of bit errors which were produced from the ***first optical receiver*** up to and including a corresponding optical receiver of the each of the plurality of receiver diagnostic output signals" (emphasis Examiner's).

> **(claim 9)** "wherein each of the diagnostic signals from said receivers indicates a number of bit errors which were produced from ***a first optical receivers*** up to and including a corresponding optical receivers of the each of the diagnostic output signals from said receivers" (emphasis Examiner's).

These limitations disclose that the "number of bit errors" of interest are produced from a "***first optical receiver***". However, Applicant's disclosure states:

> "That is, each transmitter diagnostic signal 225 and receiver diagnostic signal 235 indicates a number of bit errors which were produce by that portion of the single continuous communication path in the WDM optical communication system from ***the first optical transmitter***, Tx1, of the first optical communication network element 110 up to an including the output of the corresponding optical transmitter 120 or optical receiver 130, respectively. Each of the transmitter diagnostic output signals 225 and receiver diagnostic output signals 235 are provided to a diagnostic analyzer 250, which may include a computer processor" (Applicant's specification filed on 17 April 2000, p. 10, l. 11-18, with the amendments filed on 26 May 2004, p. 2, emphasis Examiner's).

Thus, Applicant's disclosure teaches that the "number of bit errors" of interest are produced from a "***first optical transmitter***", not a first optical ***receiver***. In contrast, the highlighted limitations of the claims above do not find support in Applicant's disclosure. Accordingly, the highlighted limitations of the claims above constitute **new matter**. As a remedy, Examiner respectfully suggests amending the claim language so that the "number of bit errors" of interest are produced from a "***first optical transmitter***".

5. **Claims 1-22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In particular, notice the following limitations in independent claims 1, 5, and 9:

> **(claim 1)** "wherein the plurality of transmitter diagnostic output signals and the plurality of receiver diagnostic output signals ***enable the single bit error rate test source to isolate*** excessive bit errors in the cascaded said N optical communication channels while simultaneously testing the N optical communication channels from the single bit error rate test source" (emphasis Examiner's).

> **(claim 5)** "wherein the plurality of transmitter diagnostic output signals and the plurality of receiver diagnostic output signals ***enable the single bit error rate test source to isolate*** excessive bit errors in the plurality of optical communication channels while simultaneously testing the plurality of optical communication channels from the single bit error rate test source" (emphasis Examiner's).

> **(claim 9)** "wherein the diagnostic output signals ***enable the single bit error rate test source to isolate*** excessive bit errors in plurality of optical communication channels while simultaneously

> testing the plurality of optical communication channels from the single bit error rate test source" (emphasis Examiner's).

These limitations disclose that the "diagnostic output signals ***enable the single bit error rate test source to isolate*** excessive bit errors" in a plurality of "optical communication channels". However, Applicant's disclosure states:

> "Accordingly, when the measured system BER for the WDM optical communication system exceeds the predetermined BER threshold for any of the communication channels, the diagnostics analyzer 250 analyzes the transmitter diagnostic output signals 225 and receiver diagnostic output signals 235 form each optical transmitter 120 and optical receiver 130 in the WDM optical communication system. ***The diagnostics analyzer 250 identifies which optical communication channel(s) are unsatisfactory by determining where excessive bit errors were detected by the on-board diagnostic circuits*** in the optical transmitters 120 and optical receivers 130 in the cascaded chain of optical communication channels. By this method, the optical communication channel(s) which are not within specification are identified so that corrective measures may be taken" (Applicant's specification filed on 17 April 2000, p. 11, l. 1-11, emphasis Examiner's).

Thus, Applicant's disclosure teaches that the "diagnostic output signals enable the ***diagnostics analyzer to isolate*** excessive bit errors" in a plurality of "optical communication channels", not the "***single bit error rate test source***". In contrast, the highlighted limitations of the claims above do not find support in Applicant's disclosure. Accordingly, the highlighted limitations of the claims above constitute **new matter**. As a remedy, Examiner respectfully suggests amending the claim language so that the "diagnostic output signals enable the ***diagnostics analyzer*** to isolate excessive bit errors" in a plurality of "optical communication channels".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of

each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Juniper

8. **Claims 1-2, 12-14, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-operating with the CIENA MultiWave Sentry DWDM System") in view of the admitted prior art (hereinafter "the APA"), Waschka, Jr. (U.S. Patent No. 4,449,247), Bach et al. (U.S. Patent No. 6,606,354 B1, hereinafter "Bach"), Bergano et al. ("Margin measurements in optical amplifier systems", hereinafter "Bergano") and Hoogerbrugge ("Optimizing test strategies for SONET/SDH/ATM network element manufacturing").

Regarding claim 1, Juniper discloses:

A method of testing a bit error rate for each of a plurality (*N*) of (multiple spans in Fig. 9) optical communication channels, *N* being greater than 2, in a wavelength division multiplexed optical communication system (the Sentry DWDM system is a WDM system) having *N* optical transmitters (transmitter modules in Sentry 1600, not shown) communicating to *N* optical receivers (receiver modules in Sentry 1600, not shown) via *N* communication channels, the *N* optical receivers being co-located (co-location in a Sentry module in Fig. 9) with each other and with the *N* optical transmitters for testing the method comprising:

cascading (concatenated spans in Fig. 9) said *N* optical communication channels such that an electrical (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters) output of an optical receiver *i* for an optical communication channel *i* is connected to an input of an optical transmitter *i+1* for an optical communication channel *i+1*, for all values of *i* from one to *N-1,* so as to form a continuous cascade of a co-located plurality of optical transmitter/receiver pairs (cascaded transmitter/receiver pairs implied in Fig. 9);

supplying (signal from BERT on p. 8) a bit error rate test signal from a bit error rate tester (BERT on p. 8) to an input for a first optical transmitter for a first optical communication channel;

supplying (implied by return of BERT test signal from concatenated spans to BERT unit on p. 8) the bit error rate test signal from an output of optical receiver *N* to the bit error rate tester; and

wherein the bit error rate test signal is provided from a single bit error rate test source (the single BERT on p. 8).

Juniper does not expressly disclose:

detecting errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured system bit error rate.

However, such detecting is the general purpose of BERT units, such as in the one mentioned on p. 8 of Juniper. Although the system in the method of Juniper was tested as error free, if the system were further lengthened so that the errors would start to appear, then the BERT of Juniper would detect such errors. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to further lengthen the transmission distance or to further increase the number of spans of Juniper. One of ordinary skill in the art would have been motivated to do this for the common purpose of finding out the transmission limits of the system, such limits being correlated to detected errors.

Juniper also does not expressly disclose:

comparing the measured system bit error rate with a predetermined system bit error rate threshold;

monitoring a signal quality for the bit error rate test signal at each of the *N* optical transmitters and each of the *N* optical receivers in the wavelength division multiplexed optical communication system when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the *N* optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value, wherein the monitoring a signal quality is associated with a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs; and

identifying, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs correction, wherein each diagnostic output signal of the plurality of transmitter diagnostic signals and the plurality of receiver diagnostic output signals is generated by its own respective performance monitor;

wherein the bit error rate test signal is operable to test the N optical communication channels from the single bit error rate test source in conjunction with the performance monitors and the diagnostic analyzer;

wherein diagnostic output signals indicate a number of bit errors which were produced from the first optical transmitter up to and including a corresponding optical transmitter of the each of the plurality of transmitter diagnostic output signals<u>; and</u>

<u>wherein the diagnostic output signals enable the diagnostics analyzer to isolate excessive bit errors in the cascaded said N optical communication channels while testing the N optical communication channels from the single bit error rate test source.</u>

.

However, Waschka, Jr. discloses such comparing (col. 31, lines 3-4) and monitoring (col. 19, lines 30-59, col. 31, lines 5-21; note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) as part of a fault location technique (col. 19, lines 30-59) that employs performance monitors (BER circuitry in each station, col. 19, l. 30-33). This fault location technique of Waschka, Jr. also includes a step of identifying a faulty communication channel (col. 5, l. 40-42, col. 31, l. 19-21) with a diagnostics analyzer (alarm units in Figs. 10-11; diagnostic output signals in col. 3, l. 30-45; col. 19, l. 30-40 generated by the performance monitors of the BER circuitry in col. 19, l. 30-33) that is similar to Applicant's step of identifying. This fault location technique of Waschka, Jr. also includes a bit error rate test signal ("BER test sequence" in col. 19, l. 20-21) that is operable to test N communication channels (links between stations in Fig. 1) from a single bit error rate test source (BER test unit 22 in Fig. 2) in conjunction with the performance monitors (BER circuitry in each station, col. 19, l. 30-33) and the

diagnostic analyzer (alarm units in Figs. 10-11). This fault location technique of Waschka, Jr. also includes "wherein diagnostic output signals ("BER indication" in col. 19, l. 40") indicate a number of bit errors (a "BER indication" is a rate of bit errors, thus indicating a number of bit errors/interval of measurement) which were produced from the first optical transmitter up to and including a corresponding optical transmitter of the each of the plurality of transmitter diagnostic output signals (The steps in col. 31, l. 3-21 correspond to the sequential testing of col. 19, l. 30-59. The BER indication at each station would correspond to a BER indication from the first transmitter up to and including the selected station performing the local BER test)". Moreover, the diagnostic output signals (diagnostic output signals in col. 3, l. 30-45; col. 19, l. 30-40 generated by the performance monitors of the BER circuitry in col. 19, l. 30-33) enable the diagnostics analyzer (alarm units in Figs. 10-11) to isolate excessive bit errors in the cascaded said N optical communication channels (col. 19, l. 30-59) while testing the N optical communication channels from the single bit error rate test source (BER test unit 22 in Fig. 2). Although Juniper is silent about fault location, the APA teaches fault location for WDM optical communication systems. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement at least some fault location teachings in the method of Juniper. One of ordinary skill in the art would have been motivated to do this since Juniper is silent about fault location and the APA teaches that fault location for WDM optical communication systems enables the common benefit of troubleshooting and repairing equipment related to located faults (Applicant's specification, p. 3, 2nd full paragraph), thus improving the quality and maintenance of the system.

Accordingly, at the time the invention was made, it would have also been obvious to one of ordinary skill in the art to further employ the fault location teachings of Waschka, Jr. in the method of Juniper in view of the APA. One of ordinary skill in the art would have been motivated to do this since, although the APA teaches that fault location may be desirable, Juniper is silent about the technical details of any particular fault location technique. Waschka, Jr. speaks into that silence by providing a fault location technique. Note that the fault location teachings of Waschka, Jr. may be suitable for the method of Juniper due to the similarities of the systems of Waschka, Jr. and Juniper, such as: BER testing units (Juniper, BERT on p. 8; Waschka, Jr., bit error rate test unit 22 in Fig. 8), cascaded optical

communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., cascaded channel links in Fig. 1, col. 19, lines 25-28), and optical transmitter/receiver pairs (Juniper, transmitter/receiver pairs implied in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

the diagnostic analyzer analyzing a plurality of *transmitter diagnostic output signals* ***from each optical transmitter*** and a plurality of *receiver diagnostic output signals* **from each optical receiver**, wherein ***each*** diagnostic output signal of the plurality of transmitter diagnostic output signals and the plurality of receiver diagnostic output signals is generated by its own respective performance monitor;

wherein the bit error rate test signal is operable to test the N optical communication channels from the single bit error rate test source in conjunction with ***each*** performance monitor in ***each*** of the optical transmitters and ***each*** of the optical receivers and the diagnostic analyzer; and

wherein ***each*** of the plurality of transmitter diagnostic output signals indicates a number of bit errors which were produced from the first optical transmitter up to and including a corresponding optical transmitter of the each of the plurality of transmitter diagnostic output signals;

wherein ***each*** of the plurality of receiver diagnostic signals indicates a number of bit errors which were produced from the first optical transmitter up to and including a corresponding optical receiver of the each of the plurality of receiver diagnostic output signals; and

wherein the plurality of *transmitter diagnostic output signals* and the plurality of *receiver diagnostic output signals* enable the diagnostics analyzer to isolate excessive bit errors in the cascaded said N optical communication channels while testing the N optical communication channels from the single bit error rate test source (emphasis Examiner's).

Rather, the diagnostic analyzer of Juniper in view of the APA and Waschka, Jr. analyzes a plurality of diagnostic output signals (col. 3, l. 30-45; col. 19, l. 30-40), each diagnostic output signal being from a performance monitor (BER circuitry in each station, col. 19, l. 30-33) in each transmitter/receiver pair (stations in Fig.1). Although the diagnostic output signals of Waschka, Jr. are not from a performance monitor in *each* transmitter and receiver, modifying the apparatus of Waschka, Jr. to do so is

obvious. That is, consider the basic technique of decentralizing a singular process from one location to multiple locations. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to decentralize the fault location process from a transmitter/receiver pair in Waschka, Jr. to other locations, such as each transmitter and each receiver. One of ordinary skill in the art would have been motivated to do this for at least one common motivation for decentralizing a singular process from one location to multiple locations, such as increasing the granularity of fault detection and location. That is, increasing the number of locations for fault detection and location leads to more precise fault location.

Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

wherein each performance monitor comprises an optical-to-electrical converter, a signal conditioning unit, an analog-to-digital converter, a microprocessor, a clock and data recovery unit, a decision circuit, and an error monitoring unit, and wherein each performance monitor actively monitors bit errors.

However, such components in a performance monitor are common. Bach shows an example of such components in a performance monitor (Fig. 2, an optical-to-electrical converter 1, a signal conditioning unit 2, an analog-to-digital converter 9, a microprocessor 13, a clock and data recovery unit (i.e., units that provide clock and data to unit 6), a decision circuit 8 or 10, and an error monitoring unit 12) that actively monitors bit errors (notice all of the active circuitry in Bach). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to incorporate the performance monitor teachings of Bach to augment the performance monitor teachings of Juniper in view of the APA and Waschka, Jr. One of ordinary skill in the art would have been motivated to do this to provide signal quality information in a short period of time (Bach, “few seconds” in col. 1, l. 61). Moreover, these components are common to use in various embodiments of performance monitors, and Bach provides an exemplary configuration of these components. Other suitable configurations that simply comprise these common components would provide suitable obvious variations.

Juniper in view of the APA, Waschka, Jr., and Bach does not expressly disclose:

wherein each performance monitor actively monitors Q by adjusting a decision level threshold provided by the microprocessor.

However, Q is well known measure of signal quality/merit in optical transmission systems, as discussed by Bergano (p. 304, col. 1, "signal-to-noise ratio (SNR)…is a natural figure of merit" in the middle paragraph, "Q is the signal-to-noise ratio at the decision circuit in voltage or current units" in the last paragraph). Also, monitoring Q by adjusting a decision level threshold is also a known technique, as shown by Bergano (p. 304-305, section III, adjustment of decision level in Fig. 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to arrange each performance monitor to also actively monitor Q in this fashion. One of ordinary skill in the art would have been motivated to do this to provide a measure of signal quality when the BER is too low to be measured in a reasonable time (Bergano, abstract), when the BER is too small to be directly measured (Bergano, p. 304, col. 1, middle paragraph), or when it is impractical to measure the BER (Bergano, p. 305, col. 2, last paragraph). Moreover, a processor is generally known to be a suitable location to store values used for comparison and/or calculations, such as the decision level threshold. Thus, an obvious variation of the method of the prior art of record would be to arrange the microprocessor (Bach, 13 in Fig. 2) to provide the decision level threshold.

Juniper in view of the APA and Waschka, Jr. does not expressly disclose:

wherein the faulty communication channel is identified responsive to simultaneous testing of the optical transmitters and the optical receivers; and

wherein the bit error rate test signal is operable to ***simultaneously*** test the N optical communication channels from the single bit error rate test source in conjunction with the performance monitor in each of the optical transmitters and each of the optical receivers and the diagnostic analyzer; and

wherein the plurality of transmitter diagnostic output signals and the plurality of receiver diagnostic output signals enable the diagnostics analyzer to isolate excessive bit errors in the cascaded

said N optical communication channels while ***simultaneously*** testing the N optical communication channels from the single bit error rate test source (emphasis Examiner's).

However, Hoogerbrugge teaches that other types of channel testing are suitable in a testing environment (p. 977, col. 1, 2nd to last paragraph), e.g., simultaneously or in parallel. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ any of these other types of channel testing. One of ordinary skill in the art would have been motivated to do this to provide design flexibility.

Regarding claim 2, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge discloses:

The method of claim 1, wherein said predetermined system bit error rate is equal to the specified bit error rate for each of *N* optical communication channels (Waschka, Jr. teaches the same error rate for a system BER and a channel-specific BER, see "prescribed level" in claims 11-12).

Regarding claim 12, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge discloses:

The method of claim 1, wherein said monitoring monitors a received signal quality (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) for the bit error rate test signal (Waschka, Jr., "test sequence" and "test signal") supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input for the first optical transmitter to the output of the optical receiver *N*.

Regarding claim 13, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge does not expressly disclose:

The method of claim 1, further comprising:

indicating that a bit error rate for each of the *N* optical communication channels is less than a specified bit error rate value when the measured bit error rate is less than or equal to the predetermined system bit error rate threshold.

However, Waschka, Jr. does disclose providing a BER indication for each of the channels when the measured system BER is unacceptable (Waschka, Jr., col. 19, lines 30-42). In the case that the measured system BER is acceptable (the measured bit error rate is less than or equal to the

predetermined system bit error threshold), it would be obvious to a person of ordinary skill in the art to set the BER of each of the communication channels to be less than a specified BER, that is, the predetermined system bit error rate threshold. One of ordinary skill in the art would have been motivated to do this in order to keep the system BER less than the predetermined system bit error rate threshold. More exactly, the system BER is the cumulative sum of the channel BER values. Thus, if the BER of each communication channel were less than the predetermined system bit error rate threshold, the system BER would be less than that same threshold. Accordingly, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to also include said indicating. One of ordinary skill in the art would have been motivated to do this to show the status of the communication channels, informing maintenance personnel of the BER status of the communication channels (Waschka, Jr., col. 5, lines 22-27).

Regarding claim 14, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge discloses:

The method of claim 1, wherein the monitoring of the bit error rate test signal is performed at an input (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38) of each of the *N* optical transmitters and *N* optical receivers.

Regarding claim 20, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge discloses:

The method of claim 1, wherein the optical transmitters and receivers for the *N* optical communication channels are co-located (Juniper, co-location in a Sentry module in Fig. 9; Waschka, Jr., Figs. 2-4, optical transceivers).

9. **Claims 3-11, 15-19, and 21-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge as applied to claim 1 above, and further in view of Bullock et al. (U.S. Patent No. 5,764,651, hereinafter "Bullock").

Regarding claim 3, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, and Hoogerbrugge does not expressly disclose:

The method of claim 1, wherein said monitoring said signal quality includes a bit parity check.

Bullock teaches a method of testing a bit error rate for optical communication systems that includes a bit parity check (Bullock, col. 1, l. 57-67). This method is a part of a common and extremely well known communications network standard, SONET (Bullock, col. 1, l. 57). Juniper already employs SONET (Juniper, p. 3, 1st paragraph). Also, a bit parity check is known as a common technique for monitoring signal quality (BER), so a bit parity check would be an obvious method for one to employ in said monitoring of signal quality.

Regarding claim 4, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 1, wherein said monitoring includes monitoring a bit interleave parity (Bullock, col. 1, l. 57-67) for said bit parity check on each electrical signal in the *N* optical transmitter/receiver pairs.

Regarding claim 5, claim 5 is a method claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding steps in method claim 5. Claim 5 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

co-located plurality of optical transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

identifying at least one faulty communication channel from said plurality of optical communication channels (Waschka, Jr., col. 5, lines 45-49) by performing a bit parity check (Bullock, col. 1, l. 57-67) for each transmitter/receiver pair (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) because the measured bit error rate (Waschka, Jr., col. 31, lines 3-4) is greater than a predetermined system bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 6, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 5, further comprising monitoring (Waschka, Jr., col. 19, lines 30-59, col. 31, lines 5-21) a signal quality for the at least one faulty communication channel using an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33).

Regarding claim 7, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 6, wherein said internal performance monitor checks a signal transmitted through the at least one faulty communication channel (Waschka, Jr., col. 19, lines 25-42).

Regarding claim 8, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 5, further comprising passing said bit error rate test signal through said plurality of optical communication channels (Juniper, concatenated spans in Fig. 9; Waschka, Jr., channel links between stations, col. 19, lines 18-30).

Regarding claim 9, claim 9 is a system claim that corresponds largely to the method claim 3. Therefore, the recited steps in method claim 3 read on the corresponding means in system claim 9. Claim 9 also includes limitations absent from claim 3. Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock also discloses these limitations:

the transmitters being co-located with each other and with the receivers for testing (Juniper, co-location in Sentry module(s) in Fig. 9);

a co-located plurality of transmitter/receiver pairs (Juniper, co-location in Sentry module(s) in Fig. 9); and

a diagnostic analyzer (Waschka, Jr., alarm units in Figs. 10-11) to analyze diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and said receivers and to identify (Waschka, Jr., col. 5, lines 40-42, col. 31, lines 19-21) at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check (Bullock, col. 1, l. 57-67) because said measured bit error rate (Waschka, Jr., col. 31, lines 3-4) is greater than said predetermined bit error rate threshold (Waschka, Jr., col. 31, line 4).

Regarding claim 10, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The system of claim 9, further comprising an internal performance monitor (Waschka, Jr., BER test circuitry in each station, col. 19, lines 30-33) coupled to said diagnostic analyzer.

Regarding claim 11, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The system of claim 10, wherein said internal performance monitor comprises an error monitoring unit (Waschka, Jr., Fig. 7, col. 15, line 64 – col. 16, line 4).

Regarding claim 15, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 16, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 5, wherein the identifying at least one faulty communication channel monitors (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 5-21) the signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21), as the bit error rate test signal is propagating from the input for the first optical transmitter through the continuous cascade of transmitter/receiver pairs.

Regarding claim 17, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The system of claim 9, wherein the plurality of optical communication channels include three or more optical communication channels that are cascaded (Juniper, up to 24 concatenated spans in Fig. 9; Waschka, Jr., note each link between each pair of stations in Fig. 1).

Regarding claim 18, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The system of claim 9, wherein the diagnostic analyzer is configured to analyze the diagnostic output signals (Waschka, Jr., col. 5, lines 31-49) from said transmitters and receivers in response to monitoring (Waschka, Jr., col. 19, lines 30-59, col. 30, lines 61-68, col. 31, lines 3-21) a signal quality of the bit error rate signal (Waschka, Jr., col. 9, line 63 – col. 10, line 3, col. 30, lines 61-68, col. 31, lines 3-21) input to each of said transmitters and said receivers (Waschka, Jr., note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42).

Regarding claim 19, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The system of claim 18, wherein each of said transmitters and said receivers (Waschka, Jr., note sequence detectors 57 and 61 in Figs. 4 and 7, col. 9, lines 42-50, col. 17, lines 14-38; note that the test signal is input into each transmitter and each receiver, col. 5, lines 28-49, col. 19, lines 13-42) is configured to monitor the signal quality of the bit error rate signal supplied by the bit error rate tester, as the bit error rate test signal is propagating from the input of the first optical transmitter to the final optical receiver.

Regarding claim 21, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock discloses:

The method of claim 5, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Regarding claim 22, Juniper in view of the APA, Waschka, Jr., Bach, Bergano, Hoogerbrugge, and Bullock disclose:

The method of claim 9, wherein the plurality of optical communication channels are arranged in the continuous cascade by connecting electrical outputs of optical receivers to inputs of optical transmitters in the plurality of transmitter/receiver pairs (implied by the use of SONET signals, which are electrical after reception by receivers and electrical before transmission by transmitters).

Response to Arguments

10. Applicant's arguments filed on 16 June 2008 have been fully considered but they are not persuasive. Applicant presents one salient point:

> The Hoogerbrugge reference is cited according to the Examiner to teach simultaneous testing. However, the combination of Hoogerbrugge with Waschka Jr. does not teach simultaneous testing with the ability to isolate bit errors on individual channels. Waschka Jr. only teaches this functionality on a single span, and not performing this functionality on cascaded spans simultaneously. There is no teaching in a combination of Waschka Jr. with Hoogerbrugge to isolate bit errors in a simultaneous test without performing sequential bit error tests.
>
> Specifically, Applicants have included the following limitation in Claim 1:
>
>> wherein the plurality of transmitter diagnostic output signals and the plurality of receiver diagnostic output signals enable the single bit error rate test source to isolate excessive bit errors in the cascaded said N optical communication channels while simultaneously testing the N optical communication channels from the single bit error rate test source.
>
> A similar amendment has also been included in Claims 5 and 9. These limitations clarify that the present invention tests all channel simultaneously using the diagnostic signals for fault isolation. Waschka Jr., on the other hand, requires each channel to be tested sequentially to determine the fault isolation. Respectfully, Applicants' limitation is not taught or suggested by Waschka Jr. or the APA.
>
> (REMARKS, p. 12, emphasis Applicant's).

Examiner respectfully notes Applicant's emphasis on the "***simultaneous***" testing aspects of Applicant's claimed invention. Waschka, Jr. teaches a sequential type of testing ("sequential testing" in col. 19, l. 42). However, the standing rejections show that the prior art of record recognizes that various types of channel testing are suitable in a testing environment: simultaneously or sequentially or in parallel (Hoogerbrugge, p. 977, col. 1, 2nd to last paragraph). Clearly, ***simultaneous*** testing is a suitable alternative to sequential testing. In view of such a recognition by the prior art of record, it follows that one of ordinary skill in the art would have been able to implement the sequential testing of Waschka, Jr. into a simultaneous testing version. For a simple explanation, testing is a process of collecting certain desired information. The main idea is the collection of this certain desired information. Obviously, one may collect this certain desired information in any number of ways, as exemplified by Hoogerbrugge (simultaneously or sequentially or in parallel on p. 977, col. 1, 2nd to last paragraph). In view of such simple and obvious concepts recognized in the prior art of record, Applicant's point is not persuasive.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID S. KIM whose telephone number is (571)272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. S. K./
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613